

AMENDMENTS TO THE CLAIMS

The following Listing of Claims will replace all prior versions, and listings, of claims in the application. This Amendment cancels claims 5 and 38 without prejudice, and amends claims 1, 4, 6, 9, 13-17, 19, 21, 23, 25, 29, 39 and 40, and adds new claim 41.

Listing of Claims

Claim 1 (Currently amended). A sheet bending apparatus comprising:

~~a first shaping mold and having a major surface, a perimeter, a portion of the major surface within and spaced from the perimeter comprising a shaping member, and at least one passageway having a first end in the major surface between the perimeter and the shaping member, the shaping member having a predetermined shaped press face;~~

an outline shaping mold defined as a second mold, wherein

the second mold has having a pair of spaced end rails and a pair of spaced central rails between the spaced end rails, the pair of spaced end rails and the pair of spaced central rails defining a boundary around an open area and portions of the end rails and the central rails providing a sheet supporting surface, and

the first mold has a perimeter, at least one passageway having a first end and a second end, and a major surface in facing relationship to the sheet supporting surface and the open area of the second mold, the major surface comprising a shaping member having a shaped press face and a boundary, the shaping member within, and spaced from, the perimeter of the first mold; a marginal edge between the perimeter of the first mold and the boundary of the shaping member and surrounding the shaping member, and the first end of the at least one passageway in the marginal edge of the major surface of the first mold;

an outer wall between the first and second molds, ~~the outer wall~~
~~defining a boundary with the sheet supporting surface of the second~~
~~mold~~ and the first end of the passageway ~~of the first mold~~ within the
boundary defined by the outer wall;

an elevator arrangement acting on at least one of the first and
second molds to move the first and second molds relative to one another
between a first position, wherein the first and second molds are spaced
from one another and the outer wall is spaced from and out of contact
with at least one of the first and second molds, and a second position,
wherein the outer wall is between and is in contact with the first and
second molds, ~~and the outer wall to~~ form an enclosure wherein the first
shaping mold provides one side of the enclosure, ~~and the second mold~~
provides an opposite side of the enclosure, ~~with wherein~~ the sheet
supporting surface of the second mold, the first end of the at least one
~~passageway~~ passageway at the marginal edge and the shaping member
of the first mold face facing enclosed area of the enclosure, and fluid
communication between interior and exterior of the enclosure is provided
~~ambient air is accessible to the enclosure at least through the open area,~~
and the at least one passageway having a second opening positioned
~~outside the enclosure wherein the passageway provides fluid~~
~~communication between interior and exterior of the enclosure.~~

Claim 2 (Original). The bending apparatus according to claim 1, wherein the
end rails and the central rails of the second mold are continuous and form a
continuous sheet supporting surface.

Claim 3 (Original). The bending apparatus according to claim 1, wherein the
central rails are secured in position and the end rails are pivotally mounted to
pivot from a first position where the end rails and the central rails provide for a
generally horizontal support for a sheet to a second position where portions of
the ends of the end rails are raised above the central rails.

Claim 4 (Currently amended). The bending apparatus according to claim 1, wherein the outer wall is securely mounted to ~~the major surface of the first mold~~ and inner surface of the outer wall defines the perimeter of the major surface of the first mold.

Claim 5 (Cancelled).

Claim 6 (Currently amended). The bending apparatus according to claim 1, wherein the outer wall is mounted to second mold and surrounds the central rails and the end rails.

Claim 7 (Original). The bending apparatus according to claim 1, wherein the outer wall has one part of an aligning arrangement and the first mold and/or the second mold has another part of the aligning arrangement.

Claim 8 (Previously presented). The bending apparatus according to claim 7, wherein the central rails and the end rails have a "T" shaped cross section defined as a "T" rail with horizontal member of the "T" rail having the sheet supporting surface.

Claim 9 (Currently amended). The bending apparatus according to claim 8, wherein the outer wall is connected to outer surface of the vertical ~~horizontal~~ member of the "T" rail and extends away from the "T" rail.

Claim 10 (Original). The bending apparatus according to claim 8, wherein the outer wall is connected to the horizontal member of the "T" rail and extends away from the "T" rail and the open area.

Claim 11 (Previously presented). The bending apparatus according to claim 8, wherein the sheet supporting surface is a portion of the horizontal member of the

"T" rail adjacent the open area and the outer wall is a portion of the horizontal member of the "T" farthest from the open area.

Claim 12 (Previously presented). The bending apparatus according to claim 6, wherein the central rails and the end rails have an "I" shaped cross section defined as an "I" rail and upper end of the "I" rail is the sheet supporting surface and the outer wall has one end mounted to an outer vertical surface of the "I" rail and extends away from the "I" rail and the open area.

Claim 13 (Currently amended). The bending apparatus according to claim 1, wherein the first shaping mold further comprises a plate member having a first major surface and a second opposite major surface wherein the major surface of the first mold ~~having the shaping member is the second surface of the plate member and the shaping member extends away from the second surface of the plate member, a plenum over a portion of the first surface of the plate member, the at least one passageway is one of a plurality of spaced passageways with selected ones of the plurality of the spaced passageways having the first end in fluid contact with the second end in fluid contact with interior of the plenum.~~

Claim 14 (Currently amended). The bending apparatus according to claim 1, wherein the first shaping mold further comprises a plate member having a first major surface and a second opposite ~~interior of the enclosure at positions spaced from the shaping member and the major surface~~ wherein the major surface of the first mold ~~having the shaping member is the second surface of the plate member and the shaping member extends away from the second surface of the plate member, a plenum over a portion of the first surface of the plate member, the at least one passageway is one of a plurality of spaced passageways with selected ones of the plurality of the passageways having the first end in fluid contact with the interior of the enclosure at positions along the marginal edge portions of the shaping member, wherein the first end of the selected ones of the passageways~~

is formed in the marginal edge portion facing the second mold, and the second end of the plurality of passageways is in fluid contact with interior of the plenum.

Claim 15 (Currently amended). The bending apparatus according to claim 1, wherein the at least one passageway is one of a plurality of passageways with selected ones of the passageways having the first end adjacent ~~at least one peripheral edge of the~~ shaping member of the first mold when the first and second molds and the outer wall are in the second position with the selected ones of the passageways passing through the outer wall and the second end of the selected ones of the passageways at or extending beyond outer surface of the outer wall.

Claim 16 (Currently amended). The bending apparatus according to claim 1, wherein the at least one passageway is one of a plurality of passageways with selected ones of the passageways having the first end formed in the marginal edge portion, and the first end of the selected ones of the passageways facing the second mold, ~~adjacent peripheral edges of the~~ shaping member when the first and second molds and the outer wall are in the second position with the selected ones of the plurality of passageways passing through the second mold and the second end of the selected ones of the plurality of passageways accessible from the exterior of the second mold.

Claim 17 (Currently amended). The bending apparatus according to claim 1, wherein ~~the shaping member has a press face and~~ the at least one passageway is one of a first plurality of passageways and further including a second plurality of passageways, the second plurality of passageways passing through the shaping member and having a first end at the press face of the shaping member; ~~the second plurality of passageways passing through the shaping member.~~

Claim 18 (Original). The bending apparatus according to claim 17, wherein the second plurality of passageways have a second opposite end and further

comprising a first plenum over the second end of the first plurality of passageways and a second plenum over the second end of the second plurality of passageways.

Claim 19 (Currently Amended). The A-sheet bending apparatus according to claim 18 comprising:

~~a first shaping mold having a major surface, a perimeter, a portion of the major surface within and spaced from the perimeter comprising a shaping member having a predetermined shaped press face; a first plurality of passageways having a first end in the major surface between the perimeter and the shaping member, and a second plurality of passageways passing through the shaping member and having a first end at the press face of the shaping member;~~

~~an outline shaping mold defined as a second mold, the second mold having a pair of spaced end rails and a pair of spaced central rails between the spaced end rails, the pair of spaced end rails and the pair of spaced central rails defining a boundary around an open area and portions of the end rails and the central rails providing a sheet supporting surface;~~

~~an outer wall between the first and second molds, the outer wall defining a boundary with the sheet supporting surface and the first end of the passageway within the boundary defined by the outer wall;~~

~~an elevator arrangement acting on at least one of the first and second molds to move the first and second molds relative to one another between a first position, wherein the first and second molds are spaced from one another and the outer wall is spaced from at least one of the first and second molds, and a second position, wherein the first and second molds, and the outer wall form an enclosure wherein the first shaping mold provides one side of the enclosure, and the second mold provides an opposite side of the enclosure with the sheet supporting surface of the second mold, the first end of the first plurality of~~

~~passageways and the shaping member of the first mold facing the enclosure, and ambient air is accessible to the enclosure at least through the open area;~~

~~wherein the first plurality of passageways have a second opening positioned outside the enclosure to provide fluid communication between interior and exterior of the enclosure, and the second plurality of passageways have a second opposite end;~~

~~a first plenum over the second end of the first plurality of passageways, and~~

~~a second plenum over the second end of the second plurality of passageways, wherein the second plenum is inside the first plenum and the first plenum is connected by a conduit to a vacuum pump and the second plenum is connected by a conduit to a valve having a first open position and a second open position with the valve in the first open position connected by a conduit to the vacuum pump and with the valve in the second position connected by a conduit to a pressurized fluid system.~~

Claim 20 (Previously presented). The bending apparatus according to claim 17, further comprising a mesh cloth securely mounted over the press face of the shaping member, the mesh cloth having a predetermined weave to provide openings of a predetermined size, wherein the size of the opening of the first end of the second plurality of passageways is equal to or less than the predetermined size of the opening of the weave of the mesh cloth overlying the opening of the first end of the second plurality of passageways.

Claim 21 (Currently amended). A sheet bending apparatus comprising:

a first shaping mold having a major surface, a perimeter, a portion of the major surface within and spaced from the perimeter comprising a shaping member having a predetermined shaped press face; a first plurality of passageways having a first end in the major surface between the perimeter and the shaping member, and a second plurality of

passageways passing through the shaping member and having a first end at the press face of the shaping member;

an outline shaping mold defined as a second mold, the second mold having a pair of spaced end rails and a pair of spaced central rails between the spaced end rails, the pair of spaced end rails and the pair of spaced central rails defining a boundary around an open area and portions of the end rails and the central rails providing a sheet supporting surface;

an outer wall between the first and second molds, the outer wall defining a boundary, wherein ~~with~~ the sheet supporting surface and the first end of the passageway are within the boundary defined by the outer wall;

an elevator arrangement acting on at least one of the first and second molds to move the first and second molds relative to one another between a first position, wherein the first and second molds are spaced from one another and the outer wall is spaced from at least one of the first and second molds, and a second position, wherein the first and second molds, and the outer wall form an enclosure wherein the first shaping mold provides one side of the enclosure, and the second mold provides an opposite side of the enclosure with the sheet supporting surface of the second mold, the first end of the first plurality of passageways and the shaping member of the first mold facing the enclosure, and ambient air is accessible to the enclosure at least through the open area;

wherein the first plurality of passageways have a second opening positioned outside the enclosure to provide fluid communication between interior and exterior of the enclosure, and the first end of the second plurality of passageways has a first opening at the press face that decreases in size at a spaced distance from the press face to provide a recess in the press face, and

a plate having a plurality of spaced holes therethrough mounted in the recess.

Claim 22 (Original). The bending apparatus according to claim 21, further comprising a mesh cloth securely mounted over the press face of the shaping member, the mesh of the cloth having a predetermined weave to provide spacing of a predetermined opening, wherein the size of the opening of the holes in the plate are equal to or less than the size of the openings in the mesh cloth overlying the holes in the plate.

Claim 23 (Currently amended). The bending apparatus according to claim 1, ~~wherein the shaping member comprises a press face and~~ further comprising a mesh cloth securely mounted over the press face of the shaping member of the first mold and at least the sheet supporting surface of the second mold.

Claim 24 (Previously presented). The bending apparatus according to claim 1 further comprising a pressing station having an upstream end and a downstream end, a heating furnace connected to the upstream end of the pressing station, a cooling furnace connected to the downstream end of the pressing station and a conveying system extending through the heating furnace, the pressing station and the cooling furnace to move the second mold along a path through the heating furnace, the pressing station and the cooling furnace wherein the first mold is mounted in the pressing station and the elevator arrangement moves the first mold toward and away from the path.

Claim 25 (Currently amended). The bending apparatus according to claim ~~24~~²³, wherein the elevator arrangement comprises an upper elongated rod to move the first mold toward and away from a portion of the conveying system in the pressing station and a lower elongated rod moveable toward and away from the first mold.

Claim 26 (Previously presented). The bending apparatus according to claim 25, further comprising a carriage moveable by the conveying system along the path, wherein the second mold is mounted on the carriage to move the second mold through the heating furnace, the pressing station and the cooling furnace, wherein the second mold moved by the carriage into the pressing station is in the first position and the lower elongated rod moves the second mold toward the second position.

Claim 27 (Previously presented). The bending apparatus according to claim 1 further comprising a pressing station, wherein the first mold and the second mold are mounted in the pressing station, the pressing station having an upstream end and a downstream end, a heating furnace connected to the upstream end of pressing station, a cooling furnace connected to the downstream end of the furnace, a sheet conveying system extending through the heating furnace and the cooling furnace and an upstream sheet transfer device mounted for movement from a position over a portion of the conveying system in the heating furnace to a position over the second mold.

Claim 28 (Previously presented). The bending apparatus according to claim 27, further comprising a downstream transfer device mounted for movement between a position over the second mold to a position over a portion of the conveying system in the cooling furnace.

Claim 29 (Currently amended). A sheet bending apparatus comprising:
a chamber having outer walls, an entrance end, an exit end, an entrance door and an exit door;
a first shaping mold mounted in the chamber, the first shaping mold having a major surface having a shaping member having a predetermined shaped press face;
an outline shaping mold defined as a second mold mounted in the chamber in facing relationship to the first mold, the second mold having a

pair of spaced end rails and a pair of spaced central rails between the spaced end rails, wherein portions of the end rails and the central rails provide a sheet supporting surface with an open area within the boundary of the sheet supporting surface;

an elevator arrangement acting on at least one of the first and second molds to move the first and second molds relative to one another between a sheet receiving position where the first and second molds are spaced from one another, and a sheet pressing position where a shaped sheet between the first and second molds seals the to are closer to one another than when in the first position;

a vacuum pump connected to the interior of the pressing chamber, and a conduit having a first one-end connected to the open area between the shaping rails of the second mold, ~~and the an~~ opposite second end connected to an air supply outside the chamber, and a portion of the conduit between the first and second ends of the conduit extending through one of the outer walls of the enclosure to move air through the conduit to the open area of the second mold wherein air moving through conduit can only enter interior of the chamber through the open area.

Claims 30-38 (Cancelled).

Claim 39 (Currently amended). The sheet bending ending-apparatus according to claim 29 wherein the elevator arrangement comprises a piston to move the second mold toward and away from the first mold, and the conduit comprises a passageway in the piston.

Claim 40 (Currently Amended). The sheet bending apparatus according to claim 39 wherein the vacuum pump is connected to the interior of the chamber though a hole in one of the outer walls of the chamber above the first mold, ~~the hole spaced from the first and the second shaping molds~~ to pull air from the interior of the chamber.

Claim 41 (New) A sheet bending apparatus comprising:

 a first shaping mold having a shaping member having a press face and a perimeter;

 at least one passageway extending through the shaping member, the at least one passageway having one end terminating at the pressing face adjacent the perimeter of the shaping mold, and the opposite end of the at least one passageway terminating at a position on outer surface of the first shaping mold spaced from the shaping press face;

 an outline shaping mold defined as a second mold, the second mold having a pair of spaced end rails and a pair of spaced central rails between the spaced end rails, the pair of spaced end rails and the pair of spaced central rails defining a boundary around an open area and portions of the end rails and the central rails providing a sheet supporting surface;

 an outer wall securely mounted to the second mold surrounding the sheet supporting surface, and spaced from and surrounding the sheet supporting surface of the second mold, and

 an elevator arrangement acting on at least one of the first and second molds to move the first and second molds relative to one another between a first position, wherein the first and second molds are spaced from one another and the outer wall is spaced from at least one of the first and second molds, and a second position, wherein the first and second molds, and the outer wall form an enclosure wherein the first shaping mold provides one side of the enclosure, the second mold provides an opposite side of the enclosure, the wall mounts the press face between the perimeter of the shaping member and the first end of the at least one passageway, and the wall surrounds the sheet supporting surface of the second mold.